Breakout Group 7

- Joe Koester, ERDC GSL, Recorder (*not responsible for any bad content*)
- Dave Lourie, P.E., Lourie Consultants, Metairie, LA
- Chuck Mendrop, CEMVK
- Michael McKown, CESAM
- Andy Morang,ERDC CHL
- Rickey Brouilette, LA DNR
- MAJ Morais, Brazilian Army Exchange Officer
- Tracy Hendren, CESAD
- Craig Waugaman, CEMVN
- Sherwood Gagliano, Coastal Environments, Inc. Baton Rouge
- James Tuttle, BC&G, Metairie, LA

Multiple Lines of Defense

- Need to get public thinking in those terms early on (has been worked to an extent so far, with public meetings, etc.)
- As engineers, we design **systems**, not only components thereof.

Innovative ways to construct barriers?

- Posted concrete barges from oil industry (spinoff from Normandy invasion history).
  - Modular breakwaters, constructed on land, floated into Lake Borgne (avg depth 5 ft) (and sunk?). Not watertight, but used as surge breakers. Barges also had fin on top to raise elevation. Can be designed to not overtop, have skid keels/skirts, can be anchored with such as piles. Lightweight, fabricated off-site; efficient for manufacture.

Alignment Issues

- Wave protection – bulk of abatement needs to be off shore, so levee or barrier need only deal with water head and some surge loading.
- Subsidence rates of barrier islands are high; affects cost of maintaining height and integrity.
- Better approach accepts geologic regression, inland, of the coast; alignments should reflect this.
- Must recognize beneficial aspects of healthy marsh on robustness of the barrier system.

Advance warning systems for imminent failure?

- Time Domain Reflectometry
- Piezometric data
- Deflections/inclinations
- Effective reconnaissance techniques
  - Visual
  - Geophysical

Soft soil improvement

- Electro-osmotic or vacuum assisted consolidation, wick drains, other technologies to improve performance of foundation soils in situ; dig and replace.
- In situ improvement (mixing, etc.) may be combined with reduced weight construction technique to economize.

What restoration features will enhance protection?

- Oyster baskets with shell bags containing oyster cultch to encourage/nourish oyster growth/reefs.
  - Has been shown in demos to preserve shoreline.
  - Honeycomb structure dissipates energy in shallow water offshore (Bay Rambo, LA)

Additional Considerations

- Known fault movement/subsidence (e.g., Golden Meadow Fault) has accelerated significantly during last 50 years.
  - In coastal zone, signature is obscured by veneer of soft sediments.
  - We must consider the presence and behavior of these in alignment selection.

Additional Considerations, cont.

- Programmatic borrow source approach will identify sites.
  - Considers residual benefits to population (recreation, water supply reservoirs), owner-supplied sources.

Additional Considerations, cont.

- Appropriate Factors of Safety for hurricane protection?
  - Recommend using a combination of traditional FoS (deterministic) analyses in conjunction with risk/reliability concepts (e.g., Bayesian concept, updateable with discrete probabilities as well as measurable quantities)

Additional Considerations, cont.

- Site Investigation Approaches
  - Progression from geophysical through such as CPT, limited borings for truth data and anomaly investigation

Additional Considerations, cont.

- Common Data Delivery/Storage Format
  - Enhances exchange among responsible parties
  - Accommodates data verification, attribution
  - Assures equal access

Group 7 Breakout Group
Thorndike Saville Conference Room

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S. G.: MRGO since 1973 (environmental issues), 2050, etc.
Plan fairly well accepted by interested parties, congress, etc. Compromised gated closures/structures approach. Funnel approach recognized early as problem. Solution to surge prob. only partially a function of the MRGO. Needed breakwater to the area at Lake Borgne. Not only from height standpoint, but also abatement of surge energy.

Subsidence always recognized as one of biggest challenge.

Posted concrete barges from oil industry (spinoff from Normandy invasion history). Modular breakwaters, constructed on land, floated into Lake Borgne (avg depth 5 ft) (and sunk?). Not watertight, but used as surge breakers. Barges also had fin on top to raise elevation. Can be designed to not overtop, have skid keels/skirts, can be anchored with such as piles. Lightweight, efficient for manufacture (recall Pontchartrain causeway construction w/in two years – similar construction technique used). In causeway, foundations not continually on lake bottom.

Modular structure to fabricate off site is first step.

How to achieve desired height? Model results will not be done prior to 1 May for all possibilities, so approach is incremental. Best to shoot for high end (40 - 45 ft).

Human intervention requirement not desirable (inflation of bladders, powered moving parts, etc.) due to unreliability over long term

Soil Improvement;
Electro-osmotic consolidation, wick drains, other technologies to improve performance of foundation soils in situ; dig and replace.
In situ improvement (mixing, etc.) may be combined with reduced weight construction technique to economize.

Other issues:
Programmatic borrow source program will identify sites. Considers peripheral effects on population (recreation, water supply reservoirs), owner-supplied sources.

Wave protection – bulk of abatement needs to be off shore, so levee or barrier need only deal with water head and some surge loading. One problem with barrier islands is that the subsidence rates are so high that the cost of maintaining height and integrity becomes prohibitive. Better approach accepts geologic regression, inland, of the coast, so we should adopt the fallback position to alignments of the future. Also must recognize beneficial aspects of healthy marsh on robustness of the barrier system.

As first priority, should recognize existing structures/barriers (S.G.)….?

Erodable fuse plugs in front levee (of self-storing system) to facilitate back drainage after passage of surge crest. Alternatively, designed-in drainage features.

Providence RI tide gate experience (built by Corps).

Multiple lines of defense; need to get public thinking in those terms early on (has been worked to an extent so far, with public meetings, etc.) As engineers, we design systems, not only components thereof.

Oyster basket with shell bags to encourage/nourish oyster growth/reefs. Has been shown in demos to preserve shoreline. Honeycomb structure dissipates energy in shallow water offshore (Bay Rambeau, LA)

Innovative ways to construct barriers?

Early warning systems for imminent failure?
TDR, piezometric data; deflections/inclinations; effective reconnaissance techniques
Protective features for overtopping?

Methods/materials to reduce life cycle costs?

Soft soil improvement?

Building materials other than soils?
EPS, Concrete modules
What restoration features will enhance protection?
Oyster cultch (clean oyster shells – larvae affinity)
Appropriate Factors of Safety for hurricane protection?
Recommend using a combination of traditional analyses and FOS (deterministic) in conjunction with risk/reliability concepts (e.g., Bayesian concept, updateable with discrete probabilities as well as measureable quantities)
How to decrease settlement and spread?

How to monitor for quality assurance?

Is soil-cement feasible?

Site/soil specific. Not suitable for all profiles. Possible prohibitive materials requirement.

Additional Issues

Known geologic (unrelated to human activities) fault movement/subsidence (e.g., Golden Meadow Fault) has accelerated significantly during last 50 years. Traces of these faults affect stability directly. In coastal zone, signature is obscured by veneer of soft sediments. We must consider the presence and behavior of these in alignment selection.